Anna Dinius and Kevin Viebrock awarded with poster prizes at 5th International Symposium on Pharmaceutical Engineering Research – SPhERe, Center of Pharmaceutical Engineering, TU Braunschweig

Anna Dinius and *Kevin Viebrock* received the SPhERe 2023 Poster Award for their innovative research on the morphology engineering of filamentous microorganisms and the development of microbioreactors for pharmaceutical applications at the 5th International Symposium on Pharmaceutical Engineering Research – SPhERe, October 18-20, 2023.

Anna Dinius received the SPhERe 2023 Poster Award for her poster

Microelectrode measurements and modelling of oxygen consumption parameters in filamentous pellets of *Aspergillus niger*

Her results were generated in cooperation with the *ibvt* and the *Chair of Process Systems Engineering, Technical University of Munich*.

Filamentous fungi are crucial in biotechnology for the production of organic compounds, enzymes and antibiotics. *A, niger*, like other filamentous microorganisms grows into different cellular morphologies. The morphology clearly depends on the cultivation conditions and the environment including the chosen medium or the addition of supplements. Thereby, dense spherical pellets are often preferred for optimal product formation. To increase viability and, thus, productivity in pellets, morphology engineering strategies can be used that alter the hyphal network by the addition of supplements.

In this study, the commonly used strain *A. niger* SKAn1015 and its hyperbranching relative *A. niger* MF22.4 were cultivated applying the morphology engineering strategies salt-enhanced cultivation (SEC) and microparticle-enhanced cultivation (MPEC). The cultivation broth of the supplemented cultivations showed beneficial effects on their growth properties, productivity and oxygen supply within the hyphal network, measured via oxygen microprofiling. Furthermore, the relationship between micromorphology and oxygen concentration profiles was investigated for control- and supplemented cultures of both strains. Therefore, three-dimensional microtomography (µCT) images of fungal pellets from different cultivation times were generated in which the oxygen profile was previously determined with microelectrode measurements. Using this data, oxygen consumption parameters were estimated in a single pellet model. These parameters can be used to predict the oxygen profile in pellets of which µCT information is available and can help identify critical, oxygen limited diameters.

Kevin Viebrock was honored with the SPhERe 2023 Poster Award for his work.

Establishment of a capillary wave microbioreactor platform to perform phagograms

This work was carried out in a joint cooperation project with the *ibvt*, the *Fraunhofer Institute for Toxicology and Experimental Medicine (ITEM)* and the *Institute of Microtechnology, TU Braunschweig.*

The increase in multidrug-resistant bacteria due to the overuse of antibiotics poses a global threat to overall human and animal health. These bacteria exhibit resistance to multiple classes of antibiotics and cause deadly infections. Phage therapy is an alternative method of treating these infections. Specificity to their bacterial host strains and the ability to attack antibiotic-resistant bacteria as well, make phage therapy a promising alternative treatment when conventional antibiotics fail. Because phages are highly specific, phagograms in analogy to antibiograms must be performed prior to administration to test the susceptibility of bacterial strains to different phages. For this purpose, large phage libraries must be screened. With current protocols, performing phagograms via double agar overlay plaque assay (DPA) is very labour and time intensive. The use of microbioreactors (reaction volume < 1000 µL) may provide

an accelerating and automated, parallelized, and economic alternative for performing high-throughput phagograms.

The objective of the research was to establish and apply an existing capillary wave microbioreactor (cwMBR) to study phage cultivation using strain *Escherichia coli* K12 and lytic phage MM02 (DSM 29475). In this work, the advantages of the cwMBR technique with its design improvements over the previously performed DPA as well as micro titer plate-based assay were presented.

Anna Dinius (left) and Kevin Viebrock (right) received the SPhERe 2023 Poster Award from the organizers of the SPhERe conference Profes. Ludger Beerhues (left) and Stephan Scholl (right).

Great, *Anna* and *Kevin* - we are very happy with you and congratulate to this outstanding success.